

REMARKS

Claims 1-2 and 4 are pending in the application. Claim 3 is herein cancelled. Claims 1 and 4 are herein amended. No new matter has been presented.

Rejections under 35 USC §103(a)

Claims 1-4 were rejected under 35 U.S.C. 103(a) as being obvious over Baiker et al. (U.S. Patent No. 4,916,109(Baiker)), further in view of “Crystallization of amorphous Zr-Ni alloys in the presence of H₂ GO, O₂, N₂ and argon gases”, Aoki et al., Journal of Materials Science, Vol. 21 pages 793-798, 1986(Aoki).

Claim 1 has been amended to be directed to “a hydrogen storage and/or transportation container comprising a hydrogen storage alloy material.” Claim 1 also has been amended to further recite “wherein said hydrogen storage alloy material has a structure where ultrafine particles of Pd, M (M is at least one metal selected from the group consisting of Pt, Au, Fe, Co and Ni) and one or more compounds thereof are precipitated and dispersed in a parent phase of ZrO₂, wherein said hydrogen storage alloy material is prepared by subjecting an amorphous Zr alloy used as a precursor to a heat treatment in air or an oxygen atmosphere so as to form the structure”.

Responding to Applicants' previous response, the Examiner alleged as follows:

In the remarks, applicant argues that Aoki teaches ZrNi and ZrPd amorphous alloys absorb considerable quantity of hydrogen, but does not indicate that Ni and Pd are interchangeable. The examiner does not find applicant's argument convincing because **Aoki's teaching shows that ZrNi and ZrPd are functionally equivalent in terms of their ability to absorb hydrogen.** Therefore, one of ordinary skill in the art would have found it obvious to use a combination of Zr, Ni and Pd metals to form an alloy with successful expectation of absorbing considerable quantity of hydrogen.

(Advisory Action, Continuation Sheet). However, Aoki et al. simply says: “it has been reported that zirconium-based Zr-Ni and Zr-Pd amorphous alloys absorb considerable quantity of hydrogen and act as catalysts for the hydrogenation of carbon monoxide.” Nothing in Aoki et al. indicates that Ni and Pd are equivalent or interchangeable. Aoki et al. describes as follows:

The nickel-rich amorphous $Zr_{37}Ni_{63}$ alloy absorbs hydrogen, forms metastable tetragonal ZrO_2 by oxidation and decomposes to form non-equilibrium nickel, ZrC, $ZrO_2(T)$, $ZrO_2(M)$ phases in CO atmosphere below its crystallization temperature. However, neither absorption of N, nor formation of ZrN was detected in a- $Zr_{37}Ni_{63}$. On the contrary, the zirconium-rich amorphous $Zr_{67}Ni_{33}$ hardly reacts with gases below its crystallization temperature, because the monoclinic oxide layers prevent direct contact between the gases and the alloy. Since the nickel-rich amorphous Zr-Ni alloy can absorb hydrogen and can dissociate CO gas, it is expected to be a candidate catalyst for hydrogenation of CO.

(Aoki et al. p.798, left column). Thus, Aoki et al. simply indicates the author's expectation of the amorphous Zr-Ni alloy to be a candidate catalyst for hydrogenation of CO. Aoki et al. does not disclose the structure of the Zr-Pd-M alloy of the present invention.

As discussed in the previous response, Baiker et al. does not teach or suggest the third metal M in the alloy composition. There is no reason for a person of ordinary skill in the art to add the third metal M to ZrPd system alloy disclosed in Baiker et al. Also, Baiker et al. does not disclose the structure of the Zr-Pd-M alloy of the present invention.

Thus, Baiker et al. and Aoki et al. do not teach or suggest “a hydrogen storage and/or transportation container comprising a hydrogen storage alloy material.” Claim 1 also has been amended to further recite “wherein said hydrogen storage alloy material has a structure where ultrafine particles of Pd, M (M is at least one metal selected from the group consisting of Pt, Au, Fe, Co and Ni) and one or more compounds thereof are precipitated and dispersed in a parent phase of

ZrO₂, wherein said hydrogen storage alloy material is prepared by subjecting an amorphous Zr alloy used as a precursor to a heat treatment in air or an oxygen atmosphere so as to form the structure.”

For at least these reasons, claim 1 patentably distinguishes over Baiker et al., Aoki et al., as well as Grasselli et al. and Gamo et al. Claims 2 and 4, depending from claim 1, also patentably distinguish over the cited references for at least the same reasons. Claim 3 has been cancelled.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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